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ABSTRACT

This document is a review of Canada's attempt to develop a standardized, multipurpose occupational classification system suited to national requirements. The main objective of Volume 1 the CCDO is to provide an instrument for use in manpower research and analysis, for statistical survey purposes, census taking, and for operational activities such as placement, counseling, training, and immigration. The basic principle used in the development of categories is the "kind of work performed." There are three distinct categories, including: (1) 23 major groups which describe broad fields of work; (2) 81 minor groups which are further subdivisions of related fields of work; and (3) 498 unit groups which describe related groups of occupations. CCDO Volume 2, "Occupational Qualification Requirements," provides a useful instrument for vocational and career counseling, as well as placement, by stressing the common requirements for broad groups or clusters of similar occupations. Each chapter in Volume 2 introduces the reader to the variety of work performed in the occupations comprising the chapter, including: (1) a summary of what the workers do; (2) a qualifications profile summarizing requirements for the group of occupations; (3) a narrative section which describes the data presented in the qualification profiles; and (4) a section on advancement and transfer possibilities within the group of occupations. (Author/PC)

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# The Canadian Classification and Dictionary of Occupations (CCDO)

## - A National Classification and Counselling Instrument -

June 1973

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## BACKGROUND

### A Standard and Multipurpose Instrument

During the past two decades, Canada has experienced a period of rapid economic development. The growth of a technological society produces numerous socio-economic changes. Although each economy makes similar responses to technological change, its occupational structure is largely a reflection of its own policies, developments and goals. For this reason it is desirable to establish an occupational classification system suited to national requirements.

A standardized, multipurpose classification of occupations is an important instrument for studying the development and utilization of manpower resources. It needs to be standardized because, for research and analysis purposes, data compiled on the basis of one system cannot be compared satisfactorily with data compiled on the basis of other systems. It needs to be multipurpose because standardization is worthless unless it meets the needs of various users and facilitates communications between them.

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Experience has shown that the development of a standard occupational classification that completely satisfies the requirements of every possible user is not practical. Statisticians or Economists studying the labour force are normally concerned with groups of occupations rather than individual jobs. Their statistics are usually assembled in a limited number of categories which are designed to contain occupations that are relatively homogeneous in terms of a particular characteristic. On the other hand, continuing manpower programs such as placement, counselling, training and immigration deal with individuals and thus specific occupational definitions are needed. For statistical reporting purposes, however, the latter programs are also concerned with groups of related occupations. This common interest provides a link between persons concerned with otherwise different programs.

The concept of a standardized occupational coding system has been recognized by many countries as essential for effective manpower planning, manpower operations and career development. In October 1966, the Quadrennial Conference of Labour Statisticians at Geneva endorsed the concept of national multipurpose classification systems and urged that these systems be related to the International Standard Classification of Occupations (ISCO).

Lack of Co-ordination and Other Disadvantages

Because Canada did not have its own standard occupational classification system a number of quite different systems were used for many years. Statistics Canada used a classification system suitable for collecting and compiling information from census enumerations, but the various classes lacked definitions. The placement operations of

Canada Manpower Centres used the United States Dictionary of Occupational Titles (DOT) to code occupations while the Immigration Service, for a number of years, used the International Standard Classification of Occupations (ISCO). It was difficult to compare data compiled from one system with data compiled from the other two systems. The use of a variety of systems tended to complicate planning and operational activities.

A Joint Effort Between Manpower and Immigration and Statistics Canada

Social scientists require an occupational classification system that enables them to determine the actual changes which have taken place in the structure of the labour force. Such a system is essential for analytical studies, and the preparation of projections and forecasts. The design of a Canadian classification system had to ensure, as much as possible, the historical continuity of statistical data. Statistics Canada, therefore, had considerable interest and input into the initial design of an occupational classification system that was to be convertible to the 1961 Canada Census and to the revised International Standard Classification of Occupations (ISCO) for international studies and reports. The Department of Manpower and Immigration required a system that was convertible to the American Dictionary of Occupational Titles (DOT) since past records were coded to this system. In 1966, to resolve these inadequacies, the Department of Manpower and Immigration and Statistics Canada, launched a joint project to develop a national classification.

## OBJECTIVES AND PRINCIPLES

### Objectives and Benefits

The main objective of the CCDO is to provide for Canada a standard multipurpose instrument for use in manpower research and analyses, for statistical survey purposes, census taking, and for operational activities such as placement, counselling, training and immigration. It is designed to facilitate analyses in various manpower fields, for example, job market analysis and worker mobility; it is a useful tool in career counselling and placement services; it provides essential data for the planning and evaluation of educational and training programs; and it has many uses for personnel operations in business and industry.

As in the past it is expected that the Census Occupational Classification now based on the CCDO will be widely used throughout Canada on many statistical surveys. Thus, the CCDO is expected to achieve the most important function of a multipurpose classification system, i.e. increasing the quantity and improving the quality of occupational information in Canada by standardizing the occupational categories and definitions used in different programs and consequently the occupational statistics and other information derived from various sources.

### Principles of Classification

The basic principle used in the development of categories at all levels in the CCDO is the "kind of work performed" which is

determined by the duties, and tasks indicated by job analyses conducted in establishments or through other investigations. Such factors as the materials worked with, the products or services resulting, the equipment and tools used, the education or training required, and the physical demands of the job have also been taken as indications of the kind of work performed.

The "kind of work performed" was selected as the basic criterion because it is significant to all users of the multipurpose classification system. Other criteria such as "training time required" or "working environment" were considered and rejected. Such criteria are related more closely to the worker than to the occupation and are thus more subjective in character. For this reason they are not acceptable as basic criteria to all users of a multipurpose classification structure.

The CCDO classification is a coding system or taxonomic structure that organizes occupations into distinct categories. The first category consists of 23 Major Groups which describe broad fields of work. The second category consists of 81 Minor Groups which are further subdivisions of related fields of work. The third category consists of 498 Unit Groups which describe closely related groups of occupations. These three categories permit the aggregation of statistics at three different levels and are designed for the common statistical reporting requirements of all types of programs dealing with occupations.

Within the major, minor and unit group structure there is an emphasis on the homogeneity of occupations held together primarily by

the "family ties" of work performed and materials used. This concept was designed to indicate the transferability of skills from industry to industry and from product to product and is a desirable feature in times of rapid occupational change.

## METHODOLOGY

### Designing a Preliminary Classification Structure

In the past the principal Canadian experience in developing an occupational classification system was that of the Population Census. Thus, the first step toward establishing a structure for the CCDO consisted of drawing up a tentative classification scheme considered suitable for the 1971 Census on the basis of experience gained from the 1961 Census and earlier surveys. The outline prepared for the 1971 Census was considered as only a rough approximation of the broad categories for the CCDO which had to be developed, not just for census purposes, but for other continuing programs such as, placement, immigration, vocational training, and counselling.

The effectiveness of the preliminary structure was then tested using two main approaches. Existing classification systems such as the International Standard Classification of Occupations (ISCO), the United States Dictionary of Occupational Titles (DOT), and the Occupational Classification Manual (OCM) developed for the 1961 Census, were compared and critically examined. The occupational definitions prepared from over 20,000 job analyses conducted throughout Canada over a period of five years were matched to the classification structure. This latter approach resulted in many major technical refinements based on additional

research studies. The end result was that all occupations within the Major, Minor and Unit Group Structure were classified on the basis of "work performed" regardless of the kind of establishment in which the occupations were found.

## DIFFERENCES AND SIMILARITIES BETWEEN THE CCDO AND OTHER CLASSIFICATION SYSTEMS

Unlike other classification systems previously used in Canada, the CCDO was prepared and is available in both the English and French languages.

The CCDO classification structure consists of an integrated arrangement of both the defined and classified occupational titles and the definitions of the major, minor and unit groups. This integrated approach is comparable to the International Standard Classification of Occupations (ISCO). Because Volume 1 is not a dictionary in the sense of the American Dictionary of Occupational Titles, there is a separate alphabetical index of all titles with their accompanying code numbers. This feature assists the reader in rapidly locating occupational data and encourages the consideration of an occupation in relation to the group in which it belongs, which ultimately leads to a greater and more fruitful use of the classification structure.

Although the CCDO owes a great deal to the features of other classification systems there is a considerable degree of innovation. The classification structure contains 23 defined major groups in place of the 9 or 10 used in other systems. This expansion of major groups is designed to overcome the practice of using such broad categories as "Professional and Technical Occupations" and "Production Process and

Related Occupations". The former practice of employing these extremely broad categories led to the classification of a large number of diverse types of occupations in single categories thus complicating the analysis of statistics.

The CCDO classification structure differs from other systems in that it does not have a single category for the commonly accepted "professional" occupations. Instead there are six major groups at the broadest level of aggregation designated as follows:

Occupations in Natural Sciences, Engineering and Mathematics;

Occupations in Social Sciences and Related Fields;

Occupations in Religion;

Teaching and Related Occupations;

Occupations in Medicine and Health;

Artistic, Literary, Performing Arts and Related Occupations.

The CCDO research staff did not believe that a Librarian and Geologist belonged in the same occupational category simply because they are "professional" persons in terms of their length of education and training and membership in professional associations. On the basis of work performed they belong in separate categories or major groups.

Unlike other classification systems the CCDO provides distinct occupational groups for persons who may be called "professional" such as Mechanical Engineers and separate groups for persons who may be called technicians or technologists. The reason for this is simply that each worker has different work functions and tasks and it is useful to identify each group statistically as well as functionally. The growth of groups of occupations called technicians, therefore, can be observed separately from the professionals with whom they are normally associated.

Special attention has been paid to the classification of managerial occupations, most of which are included in the first Major Group called Managerial, Administrative and Related Occupations. As explained in the definition of this Major Group it is reserved generally for occupations concerned with "high-level" management. Some occupations to which the term "manager" is often applied are not intended to be included in this major group. Thus, managers of operating units that are usually small in size where the typical manager performs the same work as his subordinates are not included. They are classified in the same minor groups of the classification structure as the workers they supervise.

Within relevant minor groups there are special categories or unit groups provided for Supervisors or Foremen. This feature results in the more meaningful classification of the so-called "lower or first line management" occupations. Similarly, special unit groups are provided in each appropriate minor group for Labourers or Elemental Workers who have little or no training and may progress to other unit groups designated for the more highly-skilled workers.

The CCDO classification structure is, therefore, unique in that unit groups are usually arranged within the broad minor groups to indicate the possibilities of promotion, the substitutability of workers, and the transferability of skills. Thus, the steps on the ladder of promotion from labourer to craftsmen to foreman are usually apparent within minor and major groups.

Within each unit group the occupations are classified according to kinds of work performed and skills and abilities required. Individual

occupational definitions are arranged generally in descending order of complexity as determined by the required degree of general educational development and specific vocational preparation. This arrangement permits the identification of a number of levels and kinds of skills. Advancement and entry possibilities to occupations in the same unit group which require greater degrees of skill and knowledge are readily apparent.

The 498 unit groups contain approximately 6700 occupational definitions each of which have a unique seven-digit code number. This special feature avoids the grouping of a multiplicity of occupational titles under one code number.

The CCDO staff recognized and provided definitions for occupational specializations such as university teachers. There are over 4,600 related titles which indicate degrees of specialization in an occupation. These related titles do not have a definition of their own but are attached to defined occupations.

Each of the approximately 6700 occupations classified and defined in the CCDO have industrial designations attached to their titles. These industrial designations are an adaptation of Canada's Standard Industrial Classification and to some extent are convertible to this system. The CCDO is similar to the United States Dictionary of Occupational Titles (DOT) in this respect.

The extensive program of job analysis conducted throughout Canada revealed that many of the occupational definitions contained in the American occupational classification system were no longer valid

in Canada. The CCDO is more up-to-date and descriptive of the Canadian scene and includes occupations not listed in the American system as well as excluding American occupations not identified or found in Canada.

The CCDO classification system is convertible to the 1961 Canada Census Occupational Classification in order to provide for historical continuity. It is also possible to convert CCDO data to the revised International Standard Classification of Occupations (ISCO) for purposes of international studies and reports. Because of its usage in the past thirty years, conversion tables have already been published to relate the occupations of the American Dictionary of Occupational Titles (DOT) to CCDO occupations.

This high degree of convertibility is possible because during the program of job and occupational analysis particular care was taken to record the appropriate conversion data for each CCDO occupational definition.

The vast amounts of data obtained through occupational analyses were recorded on magnetic tapes in a logical sequence. Both volumes of the CCDO were printed from the magnetic tapes. Because the data is on tape it can be made available for a wide variety of uses; for example, the coding and printing of lists of job vacancies for placement purposes, and the development of computerized student guidance information systems by a number of provincial departments of education.

## CCDO VOLUME 2 - OCCUPATIONAL QUALIFICATION REQUIREMENTS

### BACKGROUND

Different jobs seem to demand different aptitudes, interests and temperaments as well as different kinds of education and training. The types and degrees of aptitude a person possesses can be measured through the proper administration and interpretation of tests. The types of interest and temperaments a client possesses can also be indicated through appropriate interest and temperament tests. For placement purposes the task of relating an applicant's qualifications to job requirements or counselling him in terms of the greatest likelihood of success in a job is greatly faciliated through the use of test data.

The Department of Manpower and Immigration uses the General Aptitude Test Battery (GATB) to measure aptitudes found to be important in successful job performance. Actual test norms, however, are not yet available except for a relatively small number of the thousands of occupations found in the Canadian economy. In the absence of standardized test results, the Canadian Classification and Dictionary of Occupations staff sought a substitute method of indicating levels of aptitude and other important factors required for satisfactory job performance in an occupation or groups of occupations.

### OBJECTIVES AND PRINCIPLES

The main objective of CCDO Volume 2 "Occupational Qualification Requirements", is to provide a useful instrument for vocational and career counselling as well as placement by stressing the common requirements for broad groups or clusters of similar occupations. This principle feature

was designed to encourage the counsellor to think in terms of a variety of possibilities for advancement and transfer to other kinds of occupations requiring similar skills, education and training.

It was recognized that many individuals are flexible and can adapt to a variety of work situations. Individual job situations can be rather limiting in scope, whereas the CCDO deals with occupational situations which are much broader in terms of work content. The stress on advancement and transferability of skills is related to the concept of career patterns which by definition are the sequence of occupations, jobs and positions occupied by a person during his lifetime. Volume 2 identifies occupational situations where there are often limited possibilities for promotion and virtually no substitutability of skills, education or training. This was done in the sincere hope that the counsellor would avoid "slotting" job seekers into work environments which limit the individual's aspirations for advancement and personal fulfillment.

Volume 2 essentially follows the occupational classification structure found in Volume 1 and develops unit groups of occupations in such a way as to delineate the qualifications that are thought to be necessary for successful performance in broad work activities. This approach avoids the confusion of having two entirely different systems for grouping occupations and is made possible by adherence to the principal of homogeneity of work performed starting with the 23 major groups, and continuing through the minor and unit groups. This design is a Canadian innovation and has received favourable comment from international researchers.

## METHODOLOGY

In order to prepare a meaningful occupational classification system, the CCDO staff embarked upon a program of job analysis studies involving over 20,000 Canadian jobs. This wealth of detail provided a data base for occupational definitions as well as a suitable foundation for the research required to develop a counselling instrument.

In its early stages, the CCDO Project employed a number of specialists in education, psychology, and guidance counselling to carry out feasibility studies leading to the design of methods for arriving at estimates of aptitudes levels, and interest and temperament ratings, using data from occupational definitions classified in Volume 1.

Since there was little test data available on individuals employed in the many thousands of occupations found in Canada, the CCDO research staff were trained by experienced counselling specialists to estimate aptitude levels for eleven separate aptitude factors and to establish interest and temperament ratings thought to be indicative of individuals employed in the occupations. The CCDO staff relied on its own rating techniques and experimental benchmarks as well as results from existing test data. Their ratings reflect judgements based on available data and cannot, therefore, have the same degree of preciseness that might be provided on the basis of test results for groups of workers in a given occupation. In general, Volume 2 contains a separate chapter for each unit group of occupations found in Volume 1, which are relatively homogeneous in terms of work performed and skills involved.

## FEATURES OF VOLUME 2 CHAPTERS

Each chapter introduces the reader to the variety of work performed in the occupations comprising the chapter. There is a summary of what the workers do, their primary functions, and the material and equipment used as well as the products made or services rendered.

The chapters contain a special qualifications profile which consists of digits and letters summarizing the requirements for the group of occupations in terms of aptitude levels, physical demands, environmental conditions, educational and training requirements, and interest and temperament ratings. This abbreviated form of representing significant data permits the counsellor to compare the qualification requirements data in other chapters within a minor group or other major groups simply by glancing at the data profiles thus, saving the counsellor the time involved in reading detailed explanations of all the data in the qualifications profiles.

The chapters have narrative sections which describe the data presented in the qualification profiles. There are statements on training and entry requirements which alert the reader to the existence of licensing, certification or registration specifications. Required degrees of education and training are spelled out in general terms to reflect the general demands of the various provinces.

Probably one of the most useful sections found in a chapter is the one on advancement and transfer possibilities. Advancement patterns to levels of work requiring greater degrees of responsibility and increased remuneration are usually identified. Transfer erns from occupation

to occupation in related or different fields of work where skills and knowledges learned in the first occupation can be applied without the need of extensive training are identified. For example, welders could become welding equipment salesmen or welding inspectors if they had the appropriate qualifications. The emphasis is definitely on transfer from occupation to occupation regardless of the type of establishment or industry.

## VOLUME 2 SUMMARY

In vocational counselling the counsellor must aid the client not only to select a suitable field of work but also to ascertain the appropriate level of potential performance in that field. If a client is being considered for the engineering field, the appropriate level could be as a professional engineer or at the technician's or draftsman's levels depending on the client's qualifications.

This function of the counsellor is greatly facilitated by the arrangement of chapters in Volume 2. Chapters are usually arranged following the minor group structure of Volume 1 where the varying degrees of complexity and steps on the ladder of promotion from labourers, to helpers, to craftsmen and supervisory occupations are readily apparent. The emphasis on mobility is not restricted to vertical movement within the classification structure but also includes horizontal movement to other minor groups and other major groups. This feature can be used effectively by employers in industry when considering the substitutability of their workers for filling job vacancies in all parts of their factory, plant or office or if a worker wishes to be transferred to another occupation within the organization.

Establishments where Volume 2 could be used to a good advantage in counselling and personnel management include high schools, colleges, universities and commercial organizations as well as industry.

The population groups for whom Volume II can facilitate career counselling and placement services include: youth, adults, the occupationally dissatisfied, the physically and mentally handicapped, and newly arrived immigrants.

Through the effective use of both CCDO volumes, these people should be able to find a vocation or a career that is more related to their own interests, abilities and achievements; is more personally rewarding and in the final analysis, encourages the growth, development and well-being of the country's economy.